Towards an industry-wide ifcOWL: choices and issues

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An increasing number of information management and information exchange applications in construction industry is relying on semantic web technologies or tools from the Linked Open Data (LOD) domain to support data interoperability, flexible data exchange, distributed data management and the development of reusable tools. Most of the information exchange and information management initiatives in construction industry currently occur via the Industry Foundation Classes (IFC), which is an open data model that is developed and maintained by BuildingSMART for the standardized representation of Building Information Models (BIM). It would thus be useful if this IFC data model could be made available also as a reference ontology for semantic web technologies, hereafter named *ifcOWL ontology*. This aim has been targeted at by a number of research initiatives by now. Yet, there is no agreement on the actual details of this ifcOWL ontology. As a result, there are many different ifcOWLs and not one singular, industry-wide ifcOWL.

In our joint presentation at the 3rd International Workshop on Linked Data in Architecture and Construction (LDAC), we give a comprehensive overview of the diverse proposals that have been made in the formalization of an ifcOWL ontology. We give a detailed look into the technical agreements and differences between these proposals. We hereby focus on the ontology that has been suggested by Pieter Pauwels and Walter Terkaj [1], and the ontology that has been suggested by Nam Vu Hoang and Seppo Törmä [2,3]. From this comparison, we outline key choices and issues that should be resolved in order to obtain a common industry-wide ifcOWL ontology (see Figure 1).

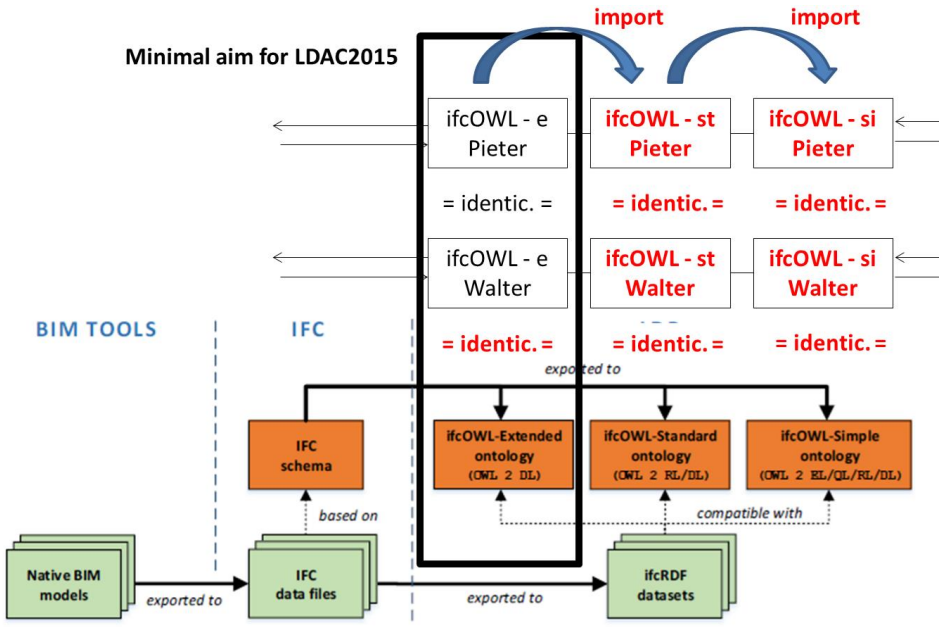

Figure 1: Based on our overview of choices and issues related to the structure of an ifcOWL ontology, the technical session can start finding agreements between the available approaches, in order to obtain an industry-wide ifcOWL ontology (image adapted from Figure by Nam Vu Hoang [3]).

Our overview indicates that many agreements are already there between the considered ontologies, when aiming at an OWL2 DL ifcOWL ontology that is as complete and expressive as possible. The main remaining issues / choices that need to be resolved, are related to the following elements:

1. Ontology name and provenance metadata
2. URI naming convention for object properties
3. URI naming convention for individuals in enumerations

We present a number of alternative options for handling these three elements. A final summary or outline can then serve as the basis for the technical session at LDAC2015, which is about ifcOWL standardisation.

References

[1] P. Pauwels and W. Terkaj, OWL ontology file for the IFC4_ADD1.exp EXPRESS schema, 2015, available online: http://linkedbuildingdata.net/resources/20150219_IFC4_ADD1.owl (Last accessed on 30 May 2015).

[2] N. V. Hoang, S. Törmä, Opening BIM to the Web IFC-to-RDF Conversion Software, 2014, available online: http://rym.fi/results/opening-bim-to-the-web-ifc-to-rdf-conversion-software/ (Last accessed on 30 May 2015).

[3] N. V. Hoang, IFC-to-Linked Data Conversion: Multilayering Approach, in: the Third International Workshop on Linked Data in Architecture and Construction, Eindhoven, Netherlands, 2015.